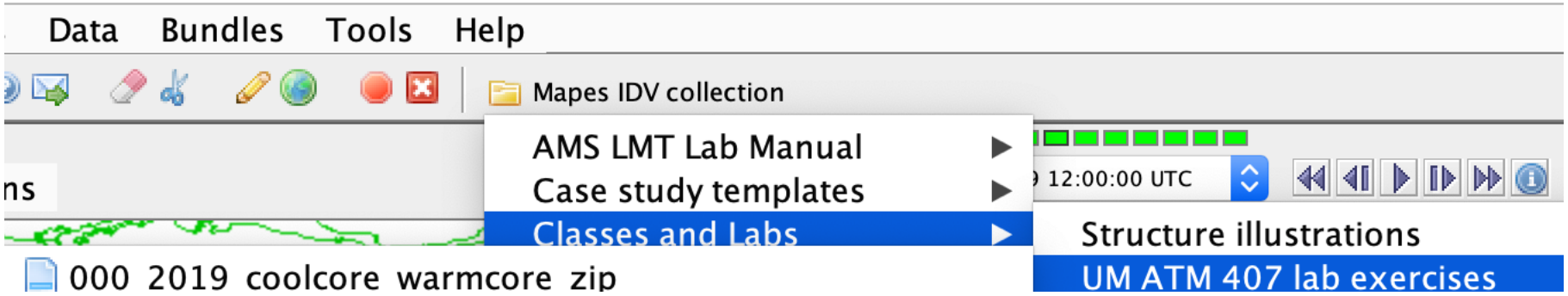
IDV lab assignment -- part 1

- Open Mapes IDV → UM ATM407…
  - 0000_coolcore_warmcore…

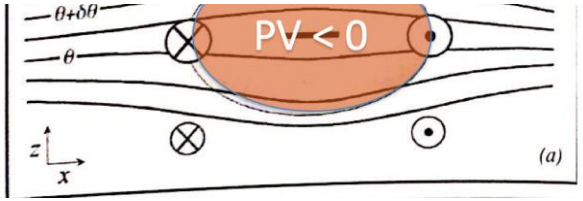


Explore ALL of its displays, at ALL of its times (loop the animation). Learn to use the IDV. The Help menu has pan-zoom help on top. A mouse is a HUGE help for 3D views.

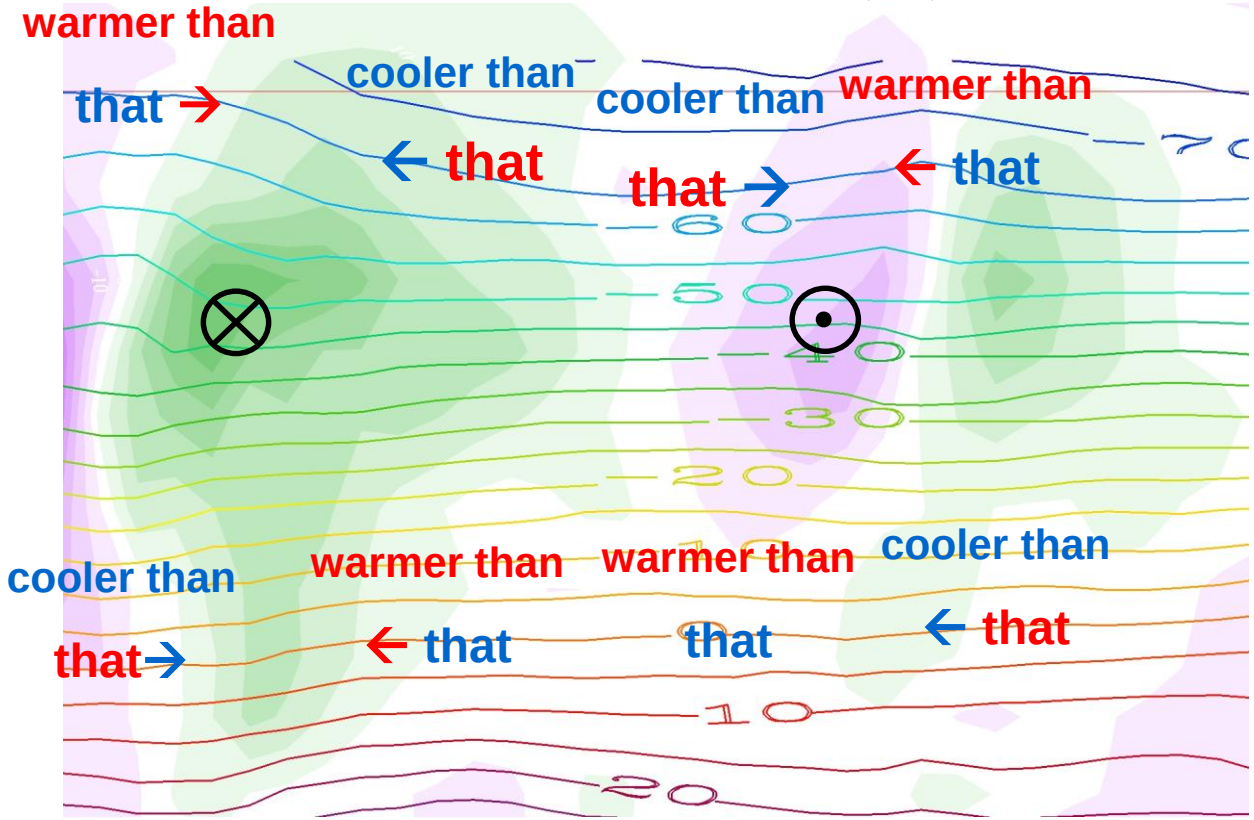
IDV lab assignment -- part 1

- In the following slides, make and label and explain nice clear illustrations like slides 13-17, but for
  - a warm core anticyclone
  - a warm core cyclone
  - a cool core anticyclone

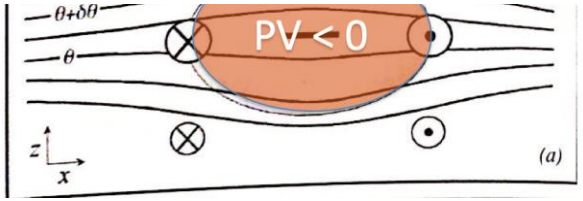
A warm core anticyclone



- **Where?** Lon: (-115° to -92°), Lat: 41.4° , Z: 11,000m
- **When?** 2009-09-24 06:00
- **Background.** V-component of wind isobaric **T(K) contours**



A warm core anticyclone



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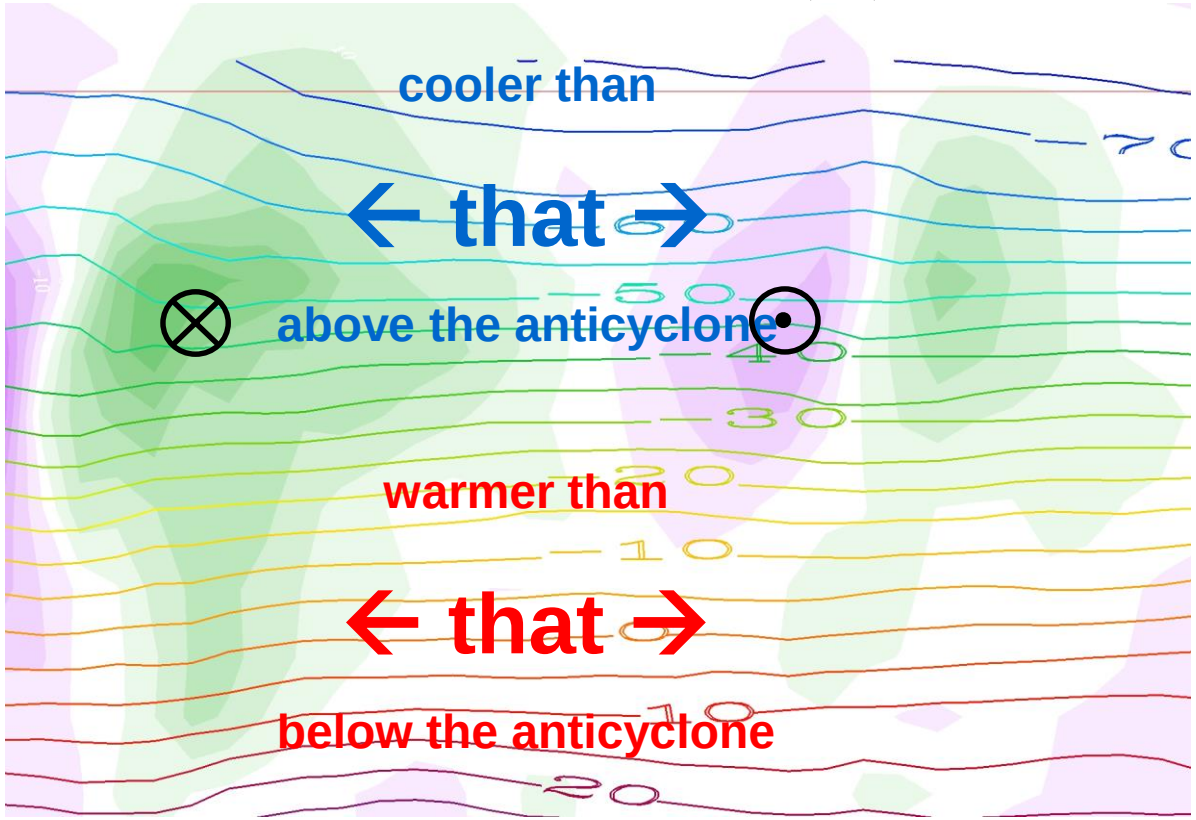
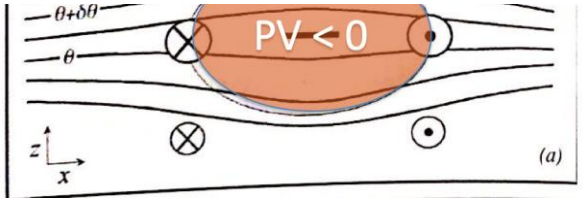
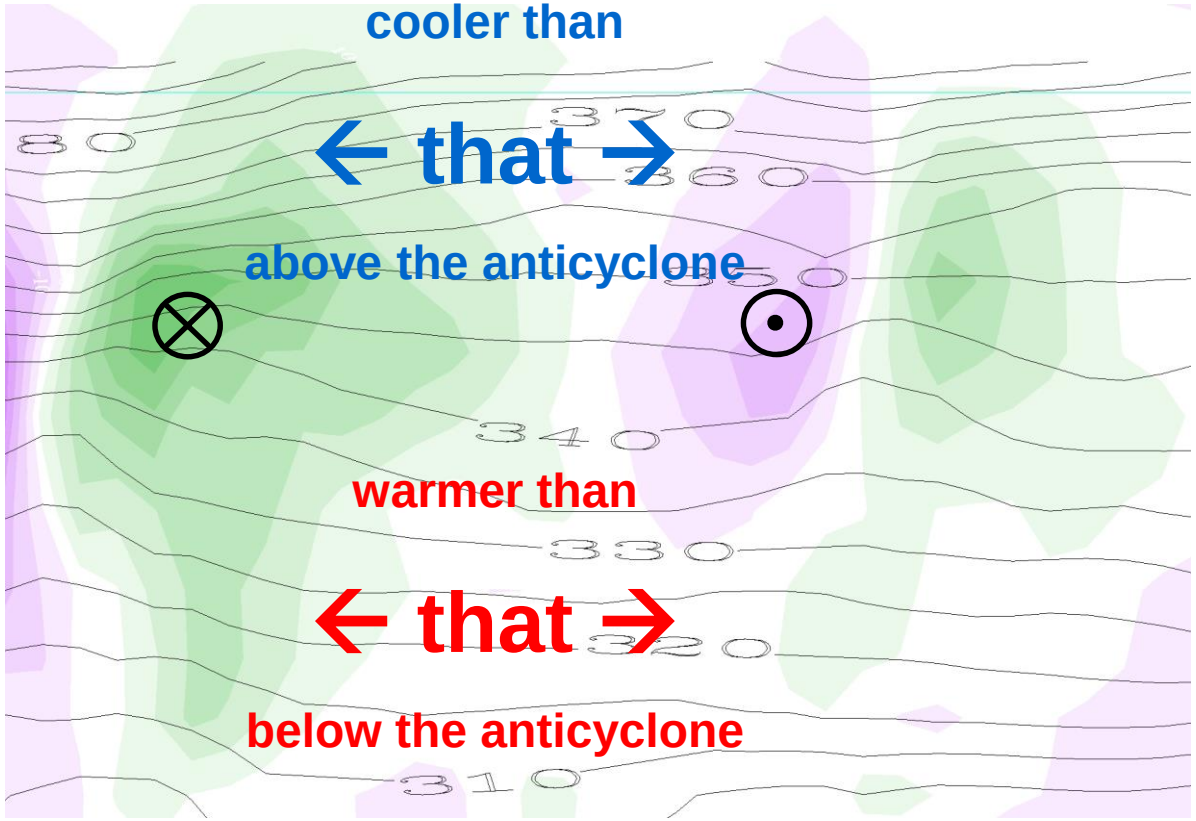


A warm core anticyclone



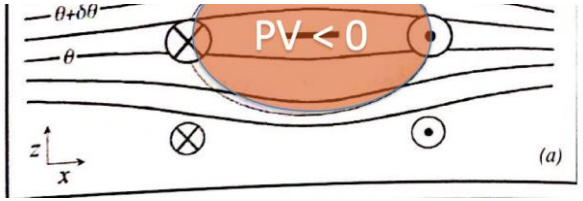
- **Background.** V-component of wind isobaric

θ(K) contours

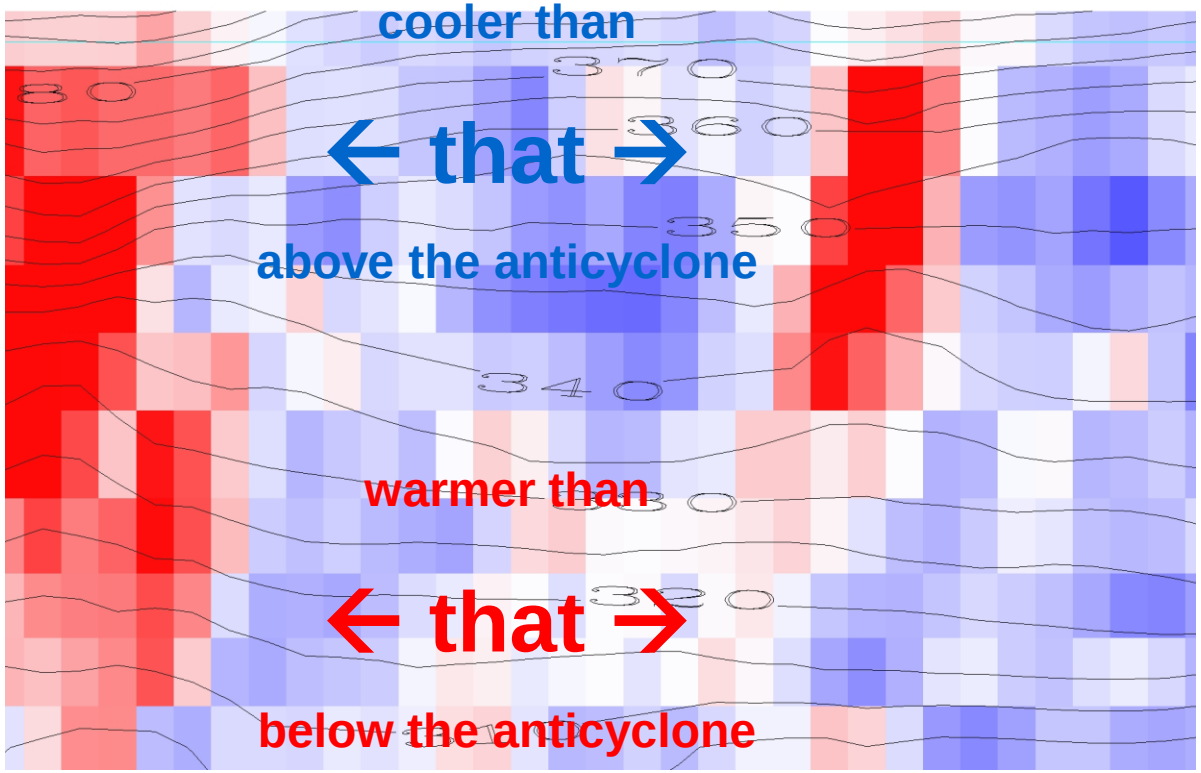


A warm core anticyclone

- **Background.** Vorticity – **Red** is positive, **Blue** is negative



θ(K) contours



A warm core anticyclone

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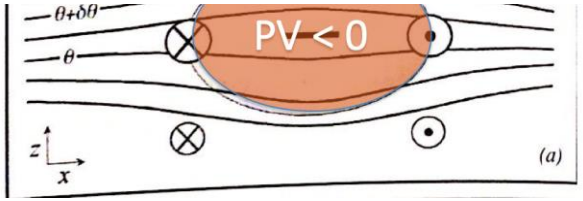
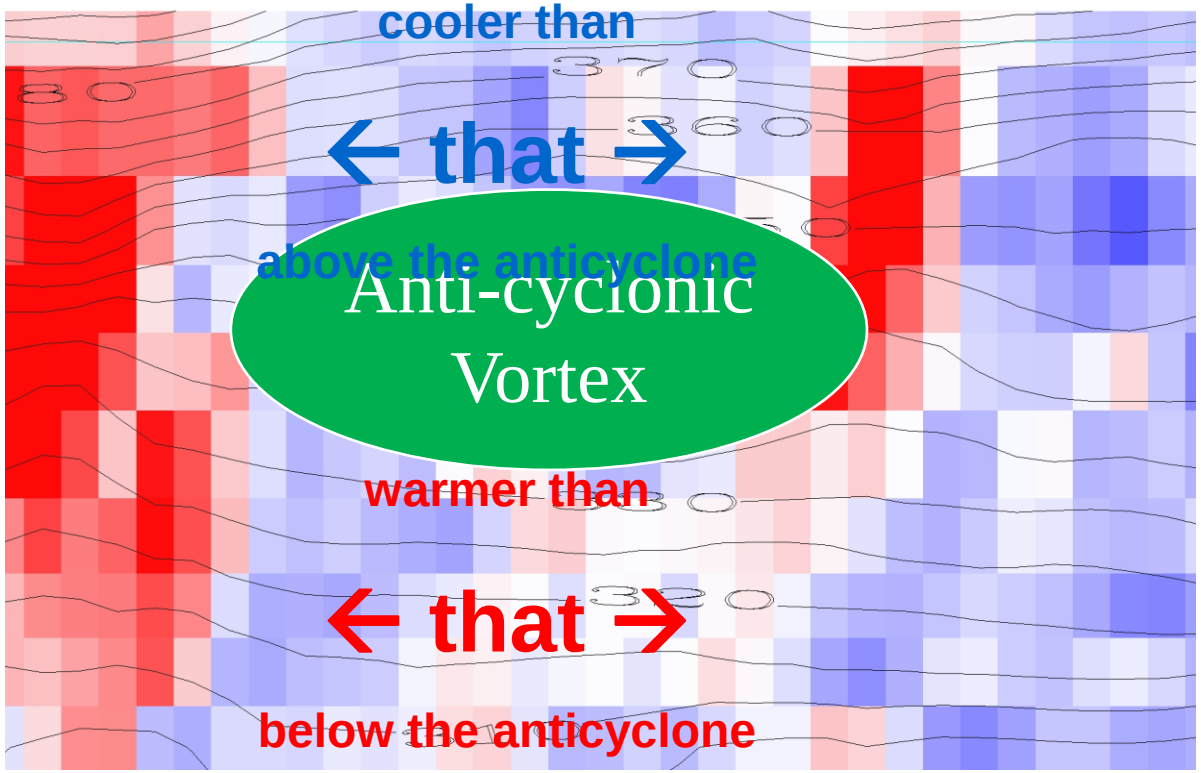
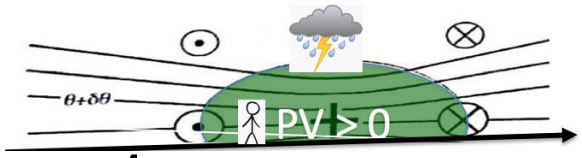


θ(K) contours



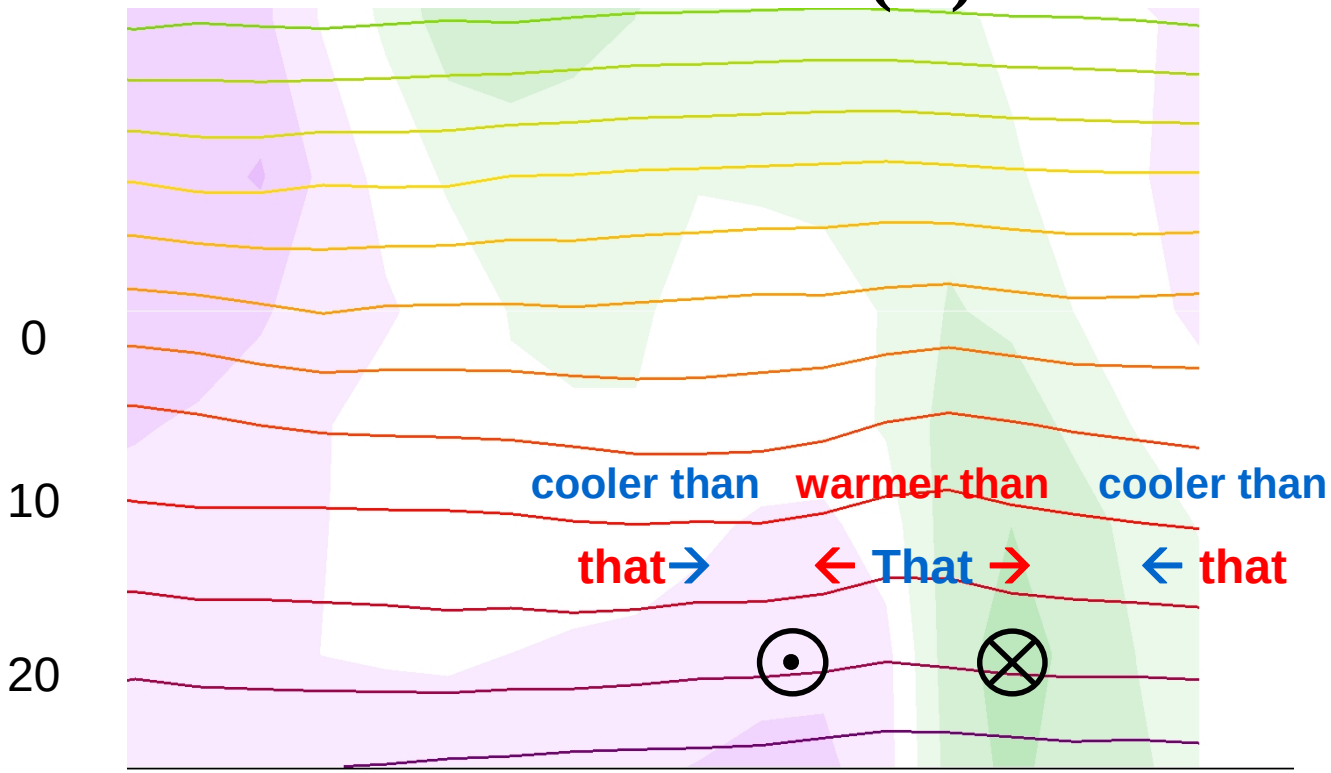
A warm core cyclone

This is called a *warm core cyclone:*



- **Where?** Lon: (-69° to -59°), Lat: 41.4° , Z: 2000m
- **When?** 2009-09-26 06:00
- **Background.** V-component of wind isobaric

T(K) contours



A warm core cyclone

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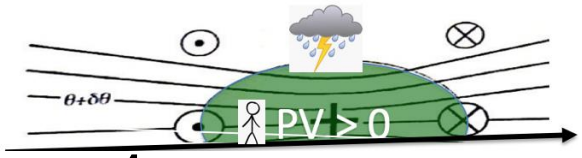

- **Where?** Lon: (-69° to -59°), Lat: 41.4° , Z: 2000m
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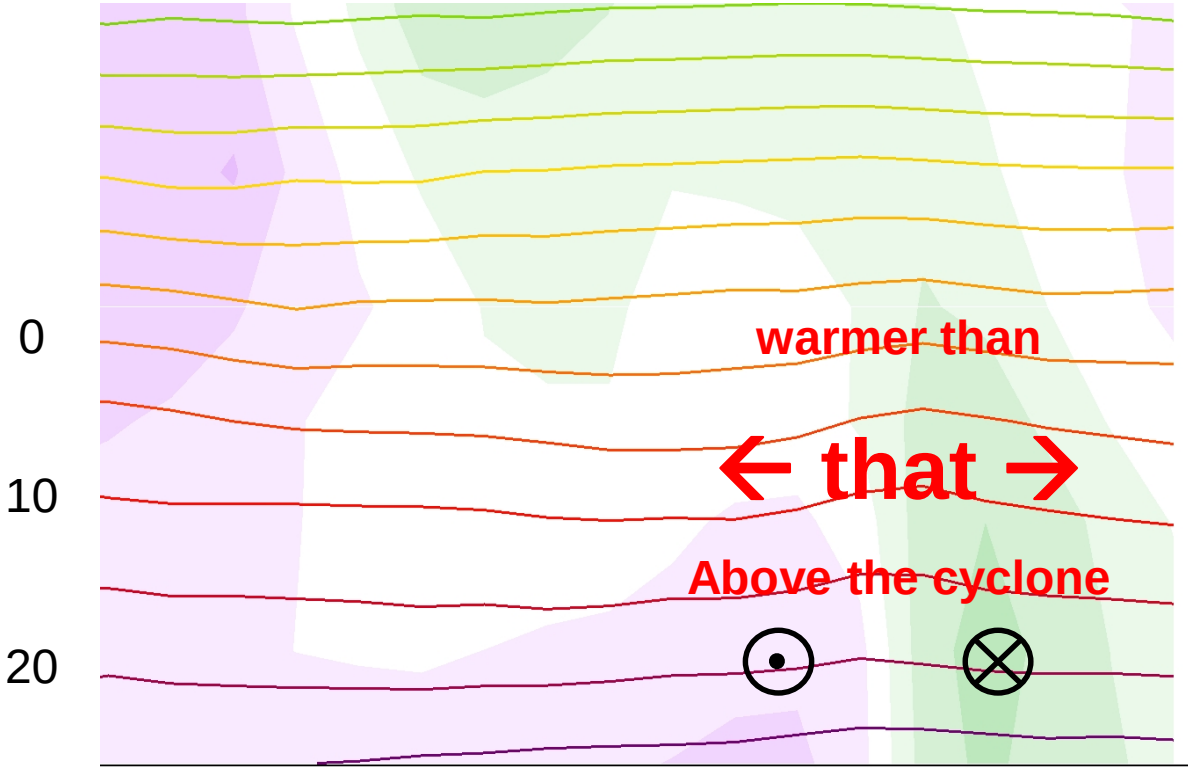
- **Background.** V-component of wind isobaric

T(K) contours



A warm core cyclone

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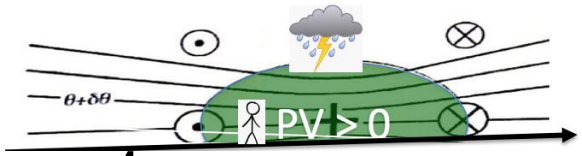
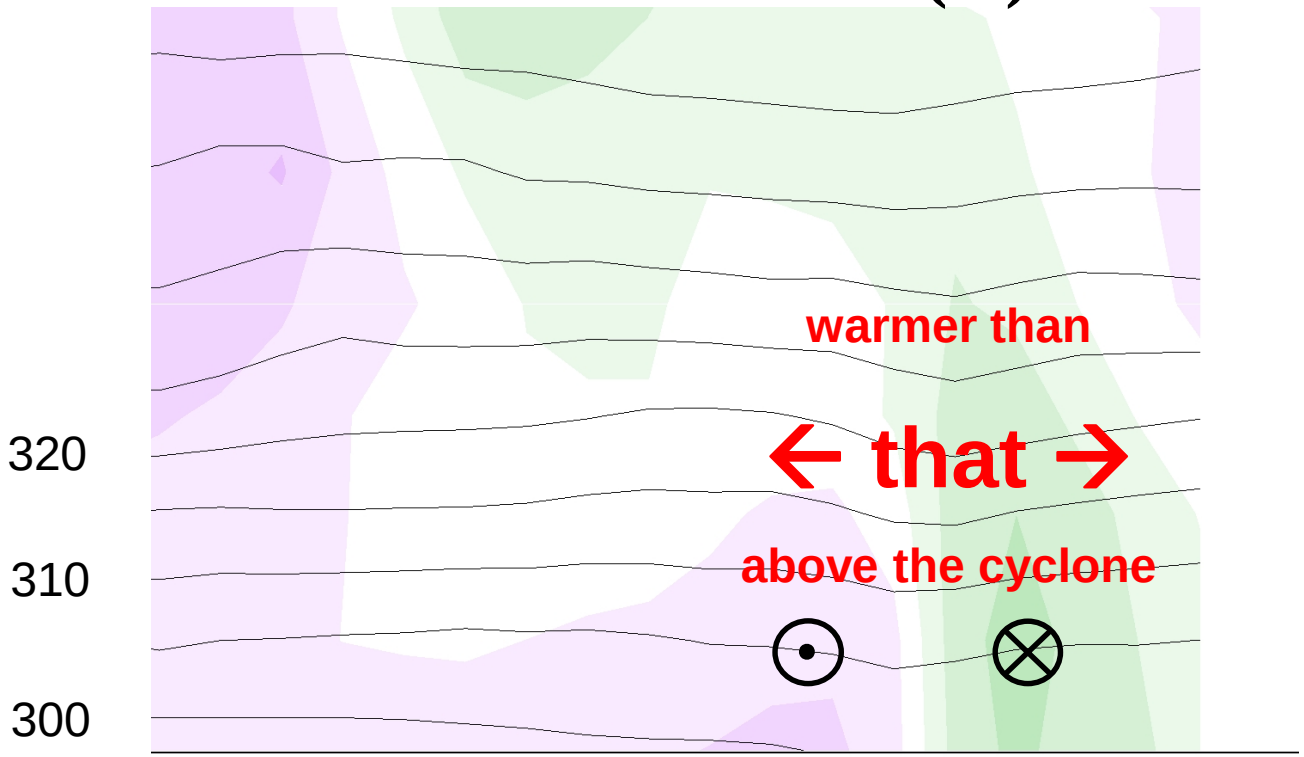


- **Background.** V-component of wind isobaric

θ(K) contours



A warm core cyclone

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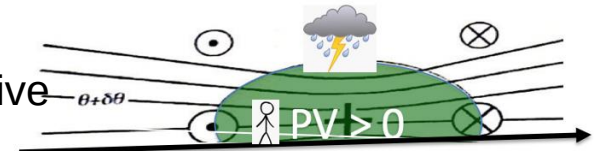
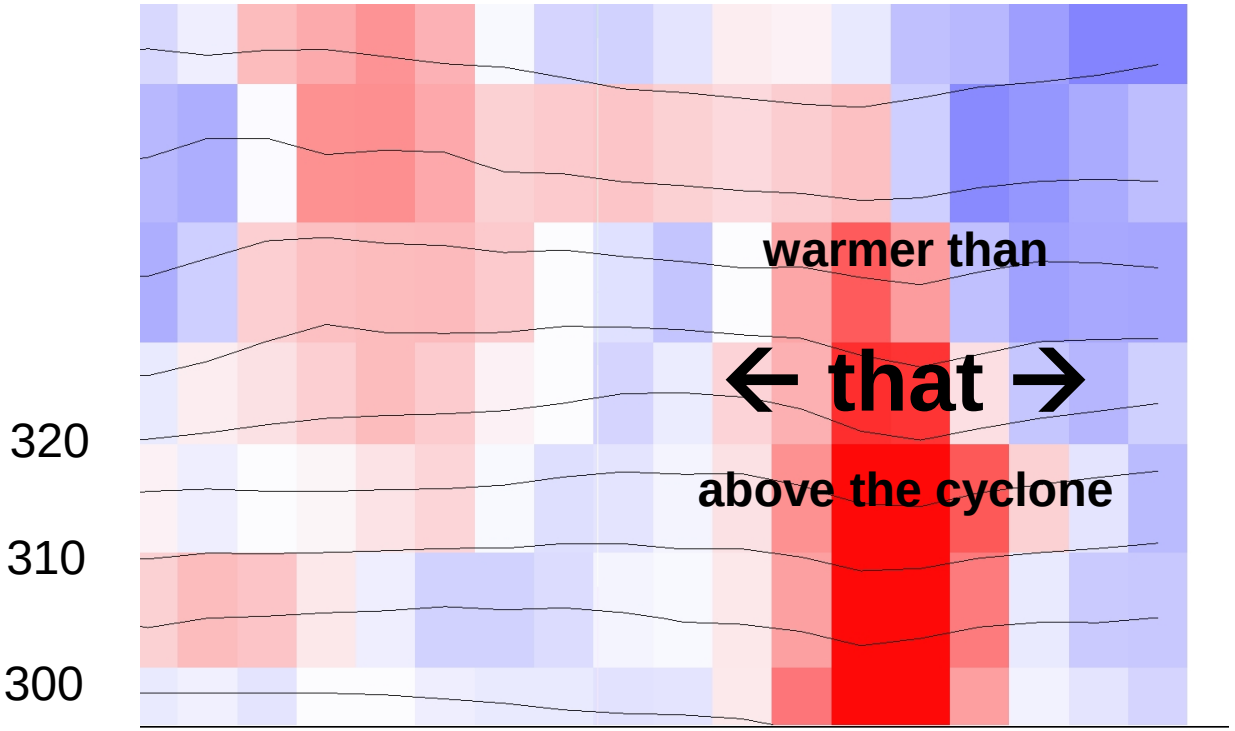


- **Background.** Vorticity – **Red** is positive, **Blue** is negative

θ(K) contours



A warm core cyclone

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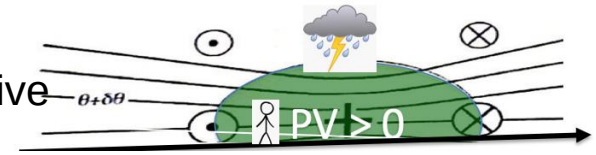

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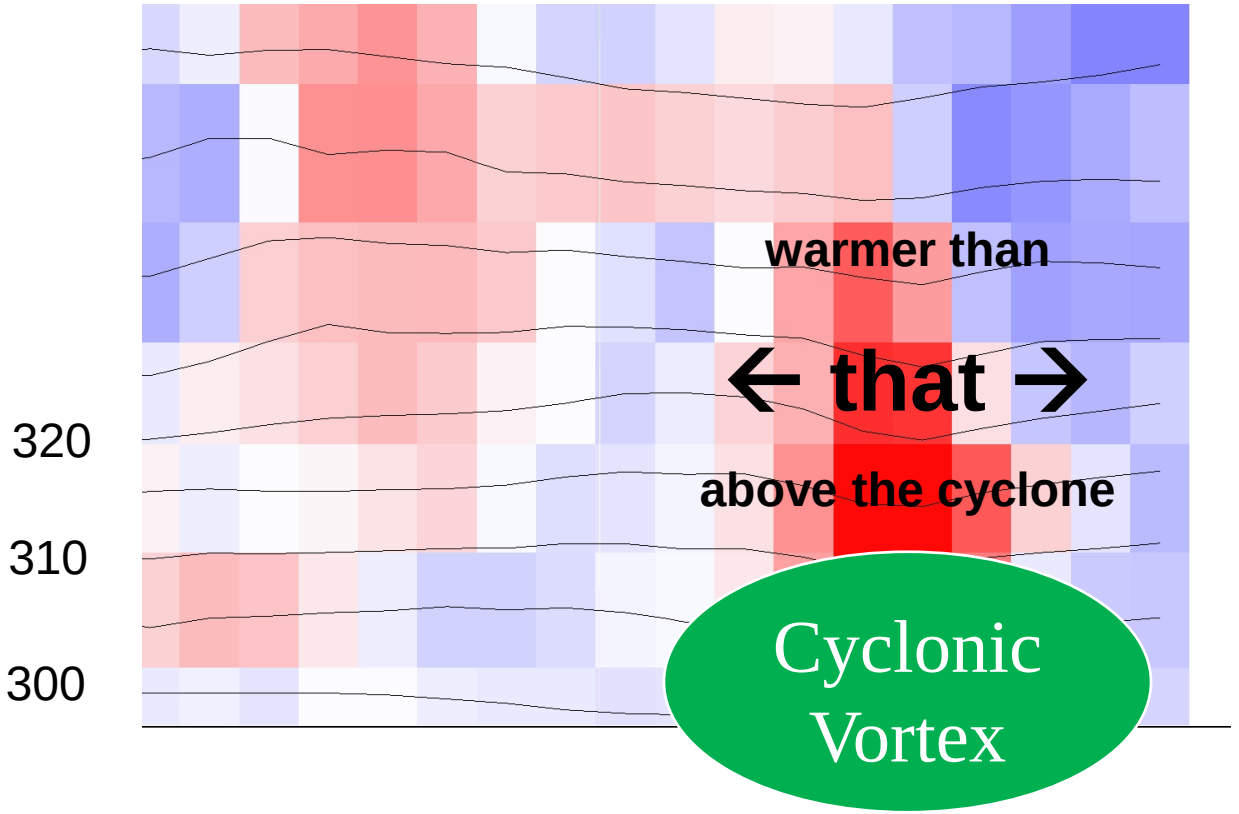
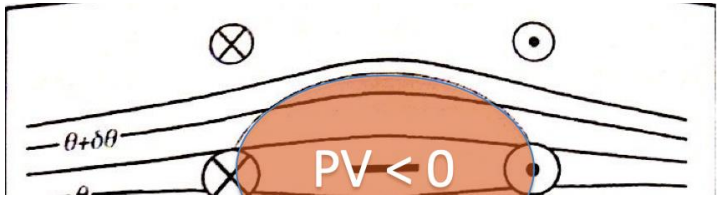
θ(K) contours

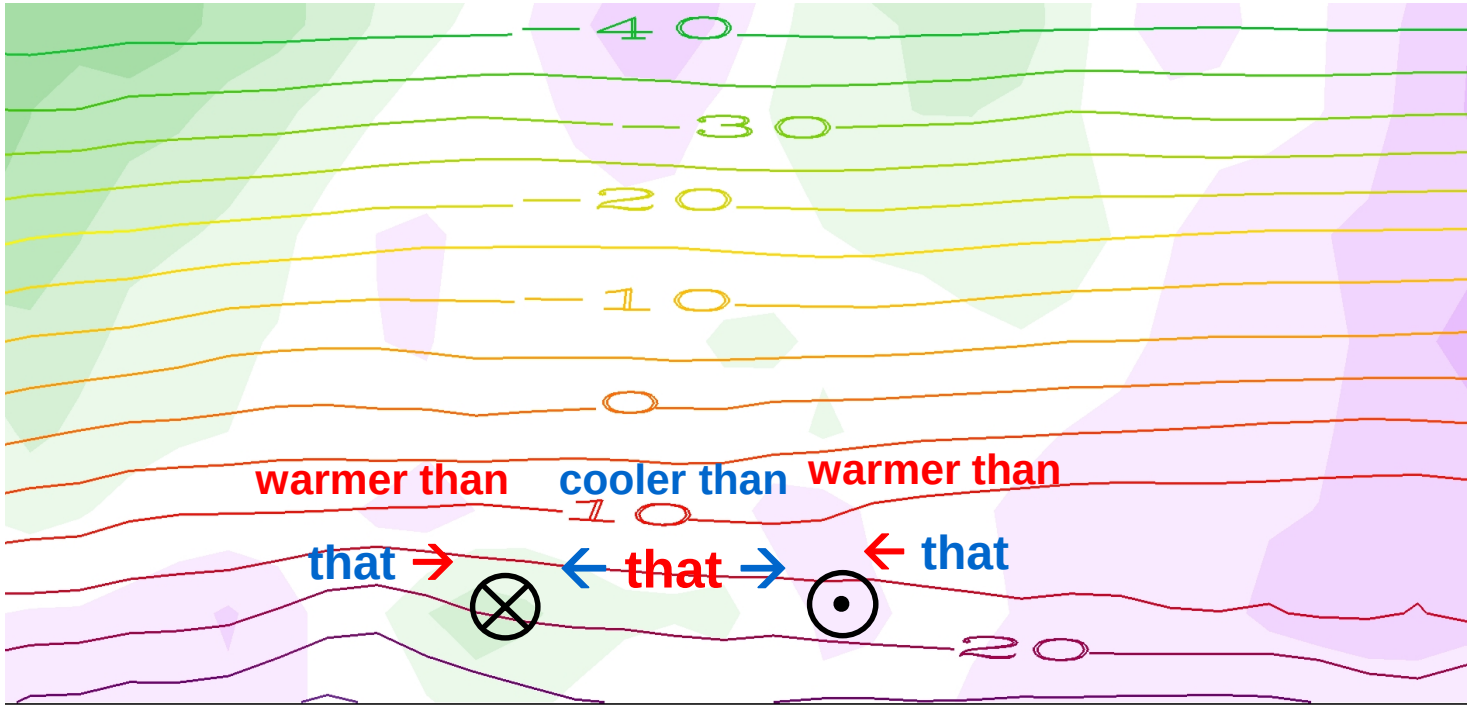


A cool core anticyclone

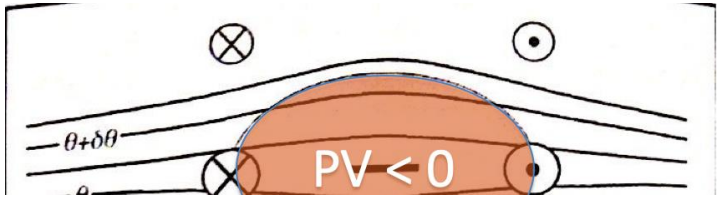


- **Where?** Lon: (-101° to -91°), Lat: 41.4° , Z: 1500m
- **When?** 2009-09-24 12:00
- **Background.** V-component of wind isobaric

T(K) contours



A cool core anticyclone



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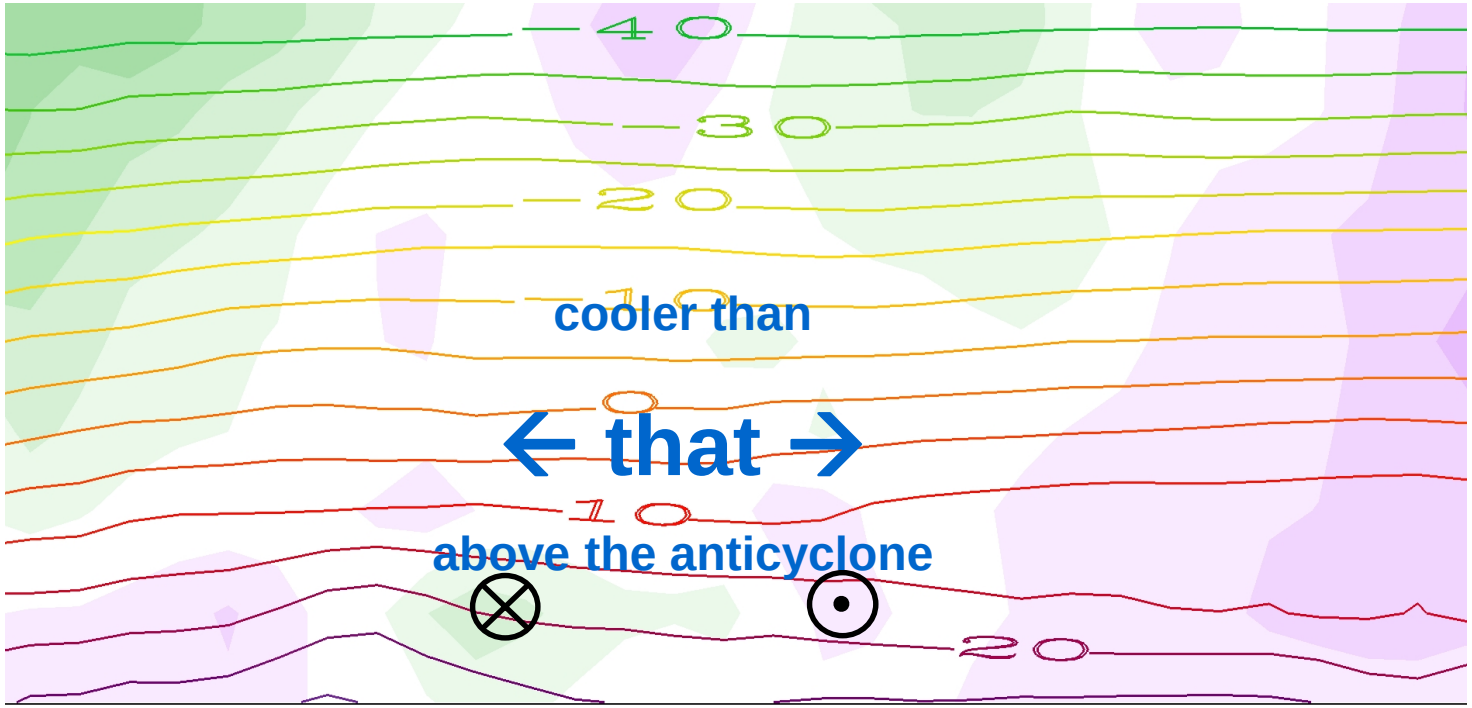
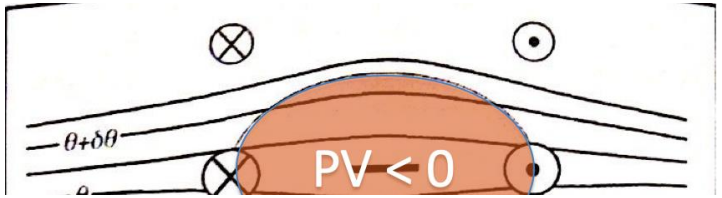
- **When?** 2009-09-24 12:00
- **Background.** V-component of wind isobaric

T(K) contours

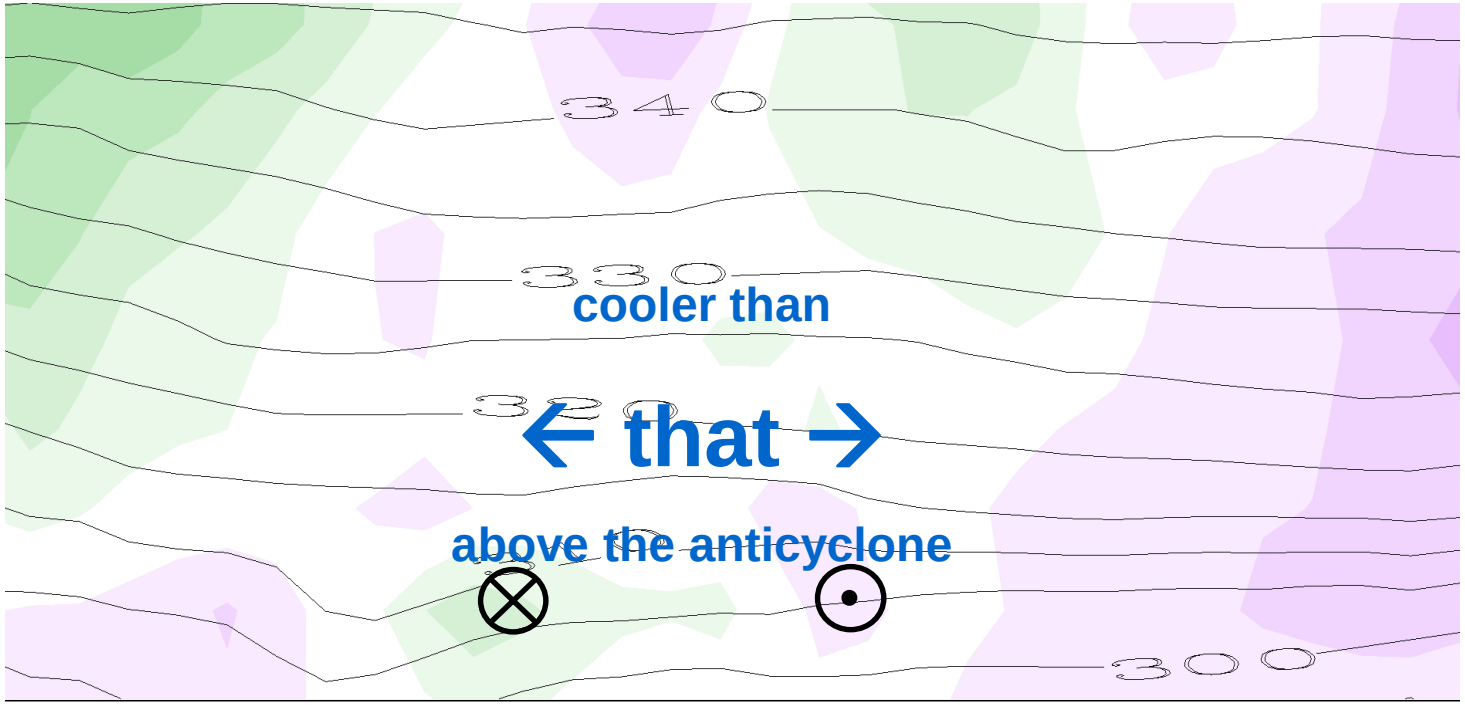


A cool core anticyclone

- **Background.** V-component of wind isobaric

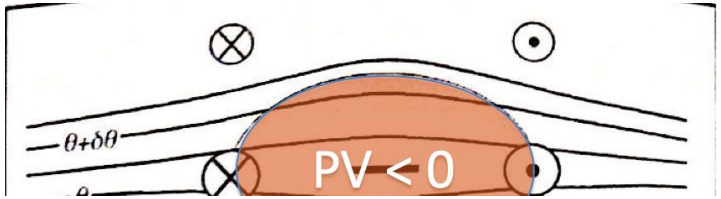


θ(K) contours

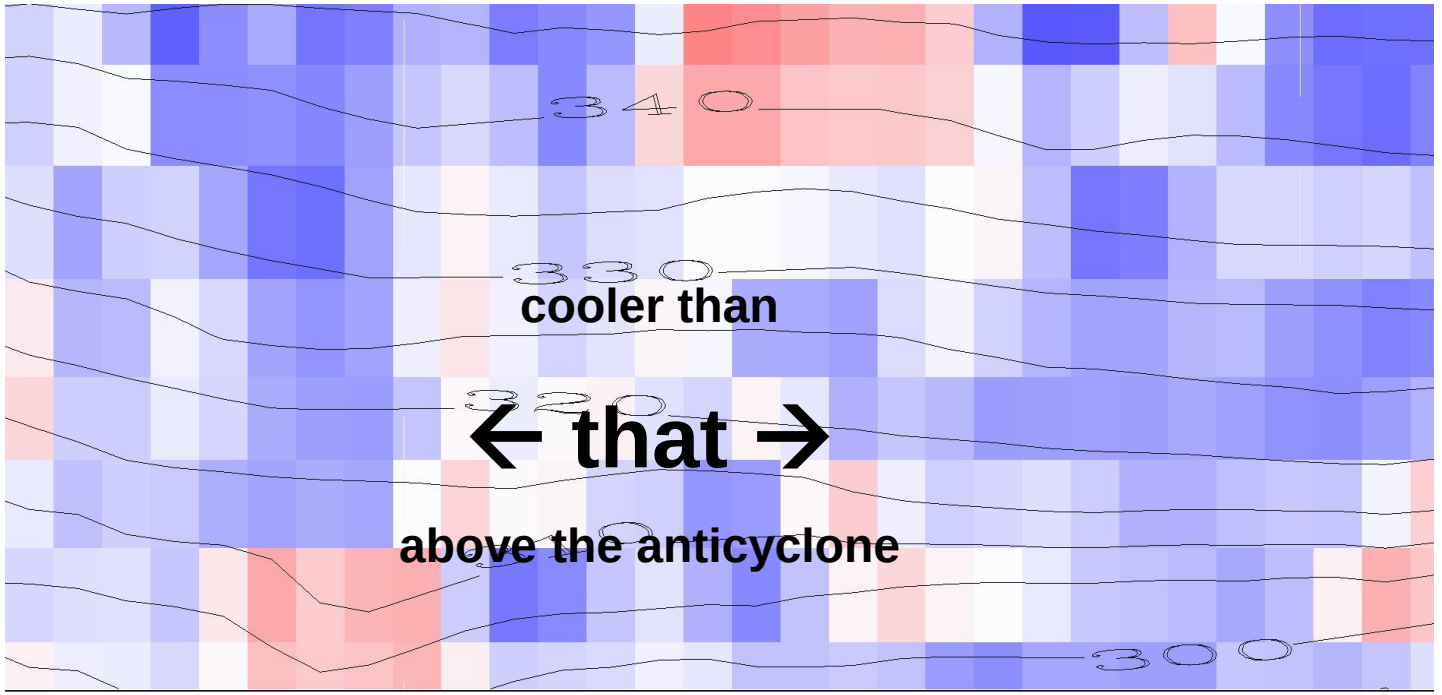


A cool core anticyclone

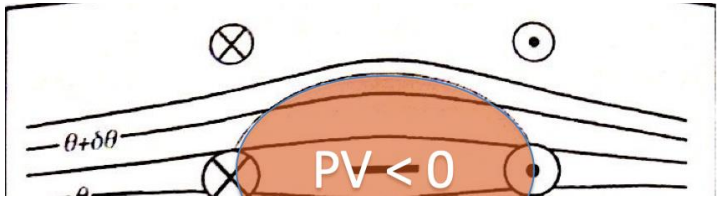
- **Background.** Vorticity – **Red** is positive, **Blue** is negative



θ(K) contours



A cool core anticyclone



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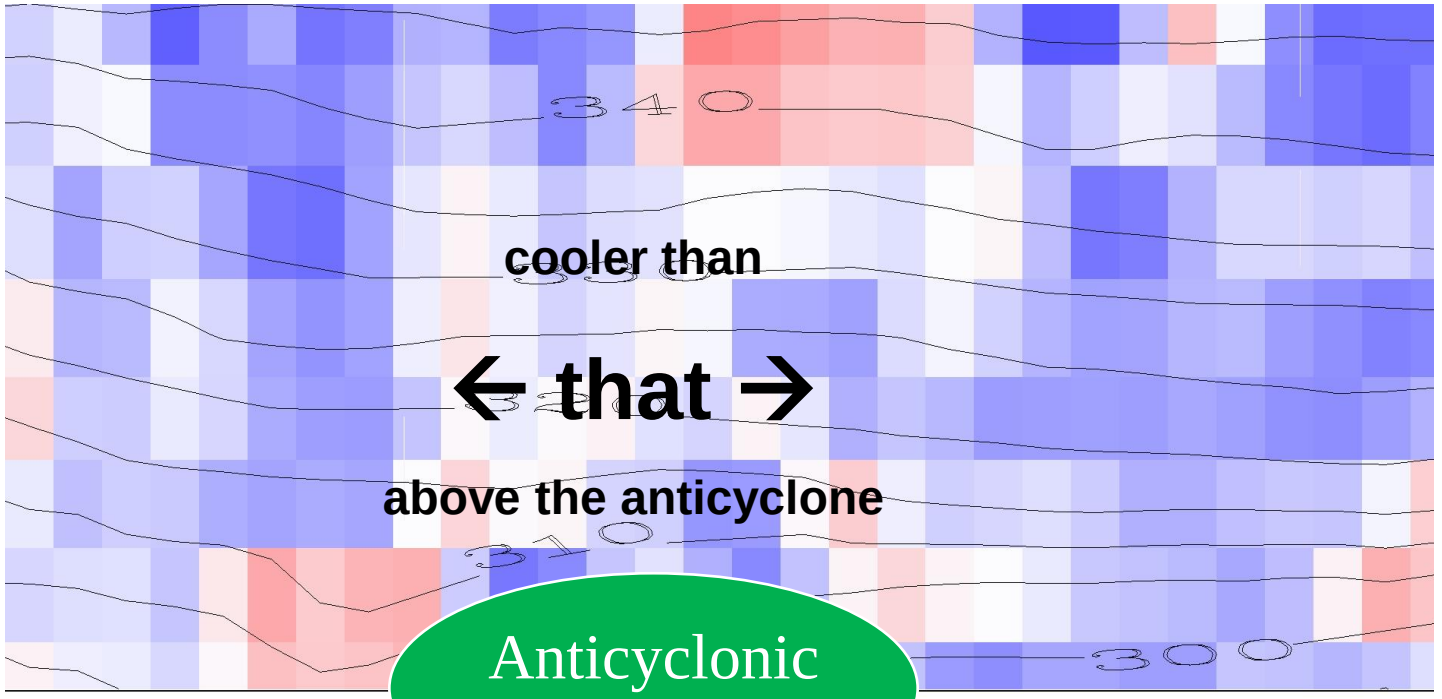
θ(K) contours

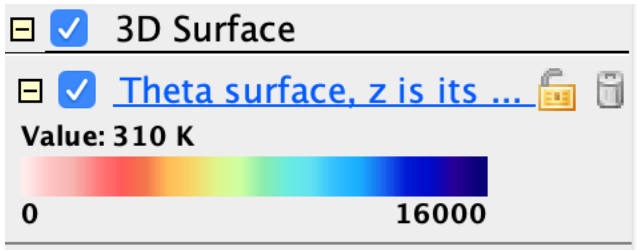


Isentropic surfaces

- Isentrope contours on the cross sections above are *slices of isentropic surfaces*
  - surfaces of constant entropy
    - or potential temperature, or dry static energy $C_pT + gz$
- Let's learn to see isentropic surfaces
- They are almost like *material surfaces*
  - because $D\theta/Dt = 0$ for adiabatic flow
    - *(plus nonadiabatic or "diabatic" complications)*
- Their vertical motion is air vertical motion!
  - the holy grail, for clouds+rain (weather)

IDV Lab assignment part 2

- In the same bundle, activate (check) the display called “Theta surface, z is its color”

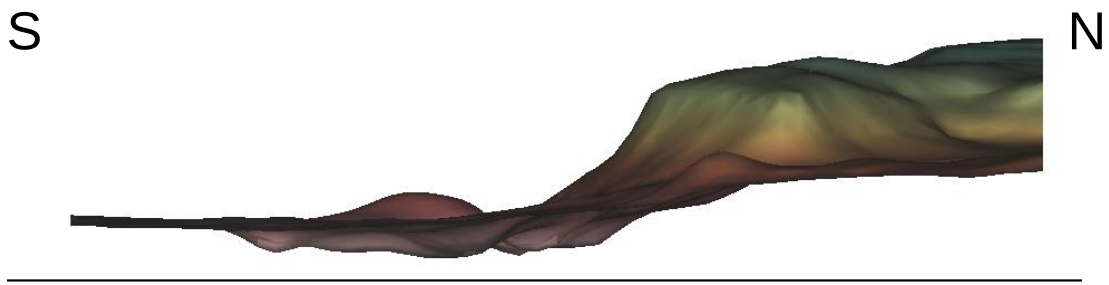


- Adjust the value (310K, 330K, 360K)
- Use vorticity isosurfaces and cross sections in an illustrated description of its topography.
  - Is there a mean north-south slope? hint: 
  - What vorticity features (Part I) explain dimples?
  - What vorticity features (Part I) explain peaks?

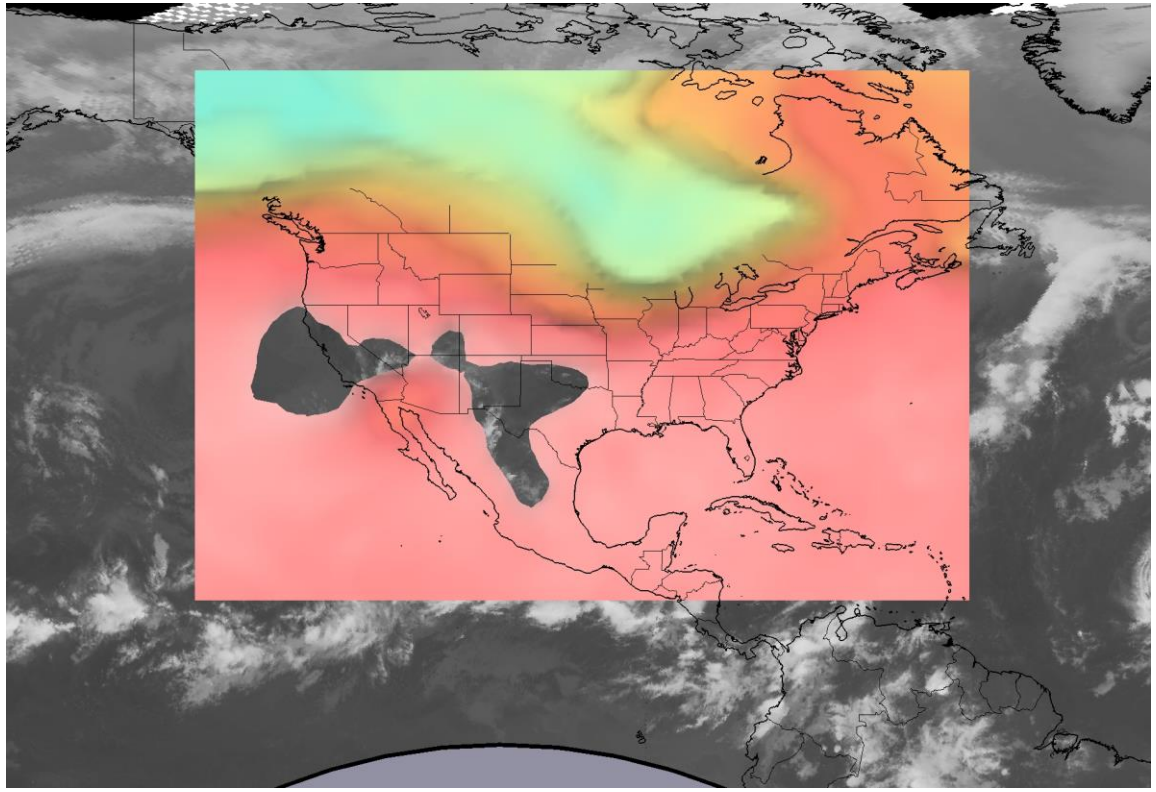
Mean slope of the 310K isosurface

- North-South slope

East viewpoint

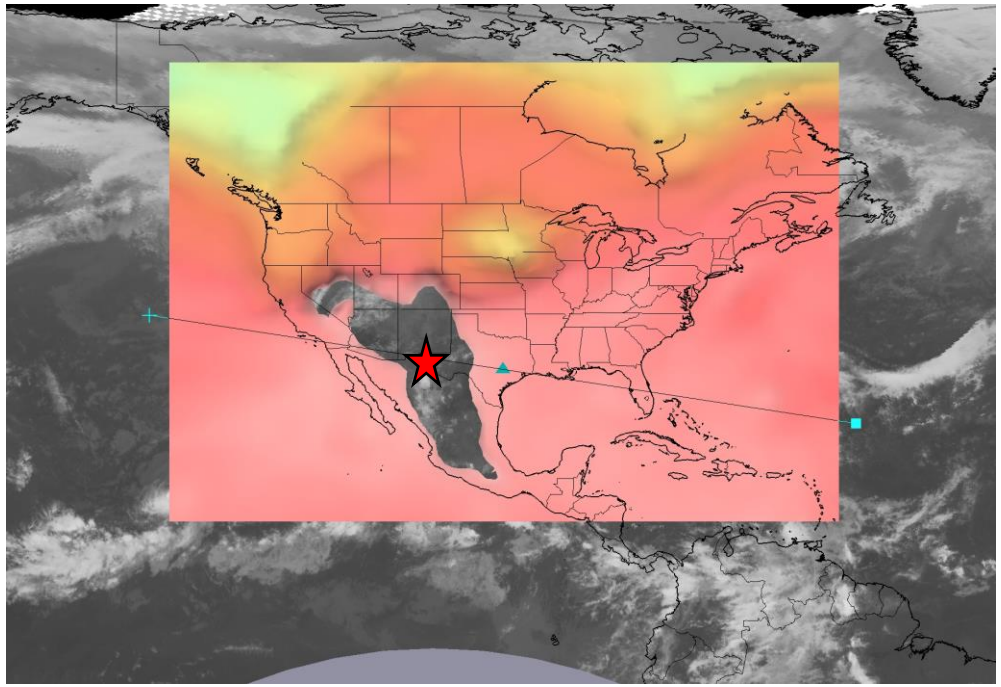


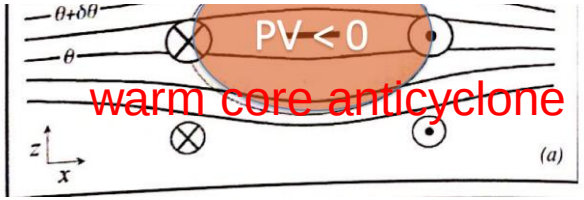
Top viewpoint

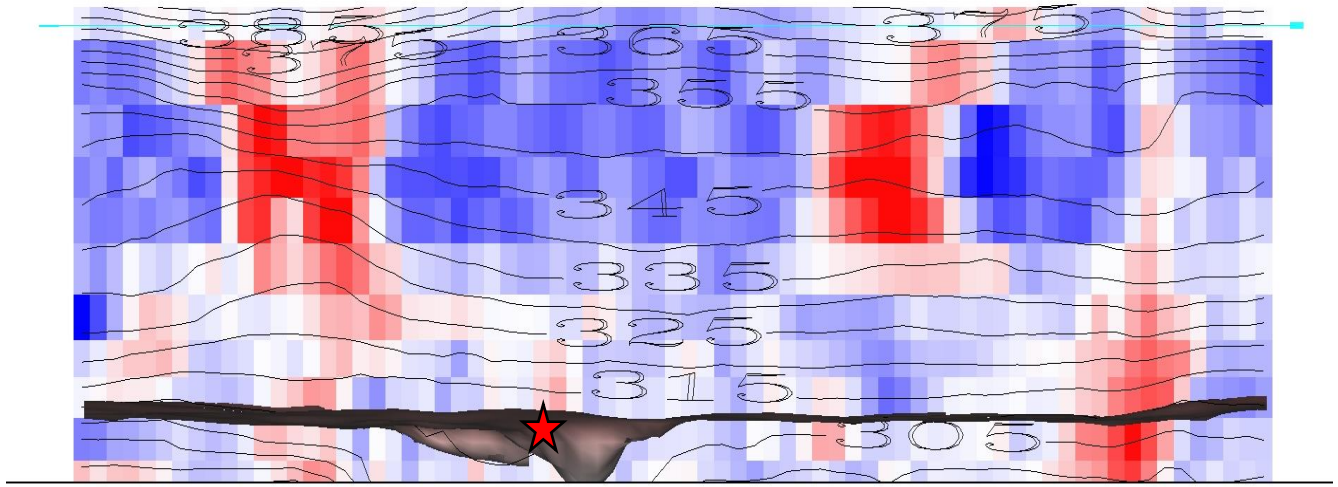


A depression in the 310K surface

Where? Describe the situation



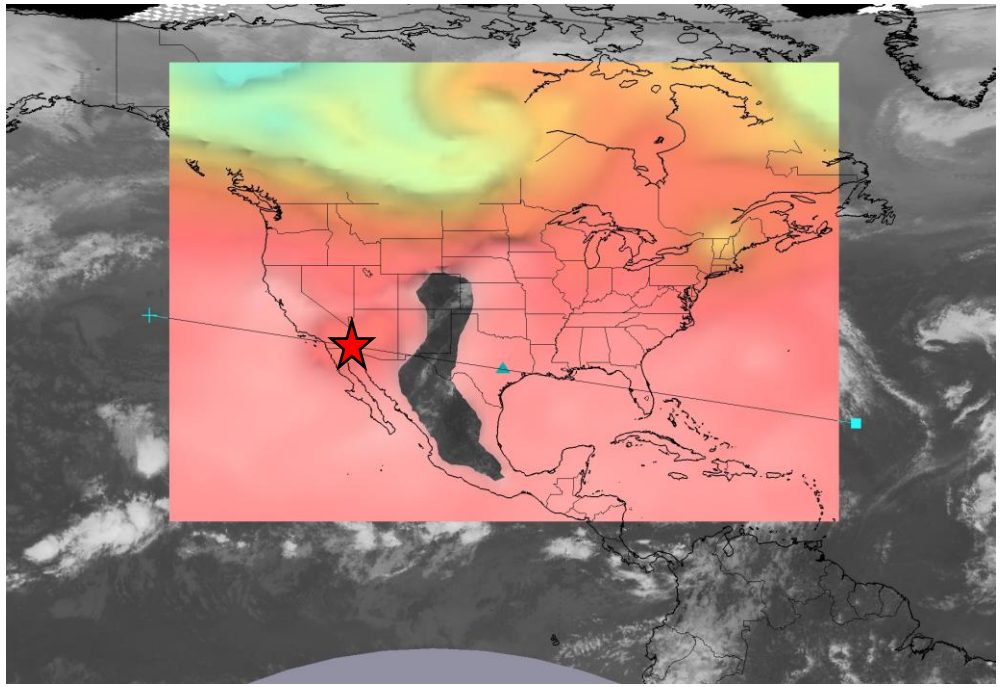


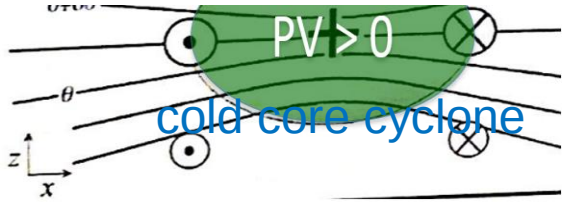


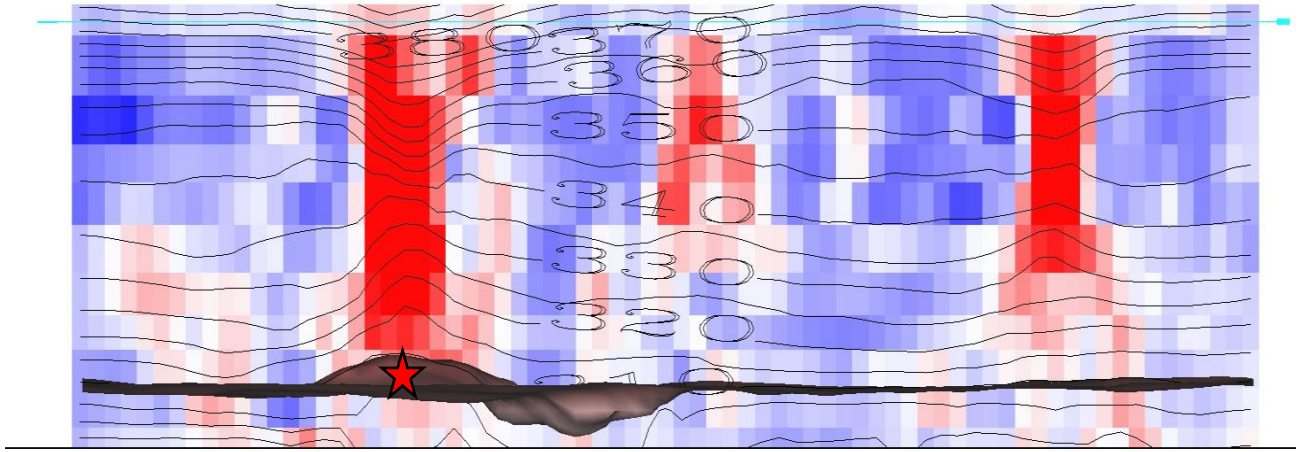
310K surface depression happens below the warm core anticyclone.

A peak on the 310K isosurface

Where? Describe the situation







310K surface peak happens below the cold core cyclone.

Mean slope of the 330K isosurface

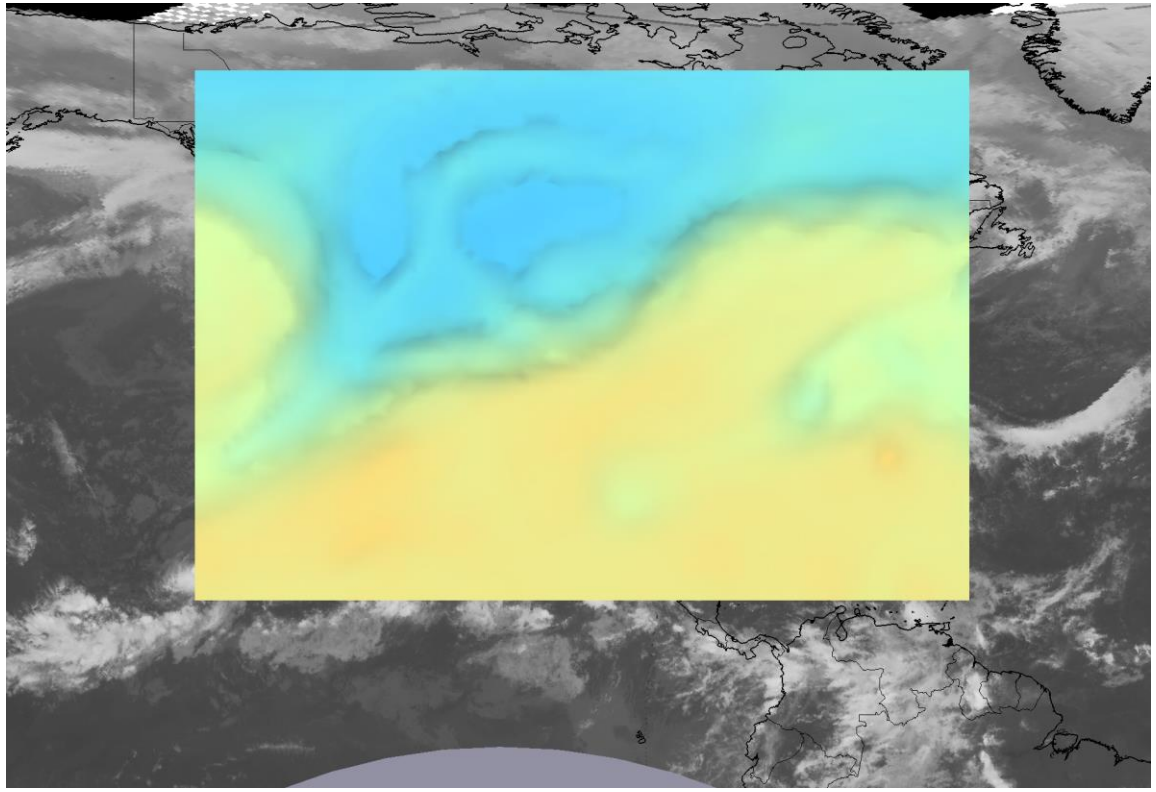
- North-South slope

East viewpoint

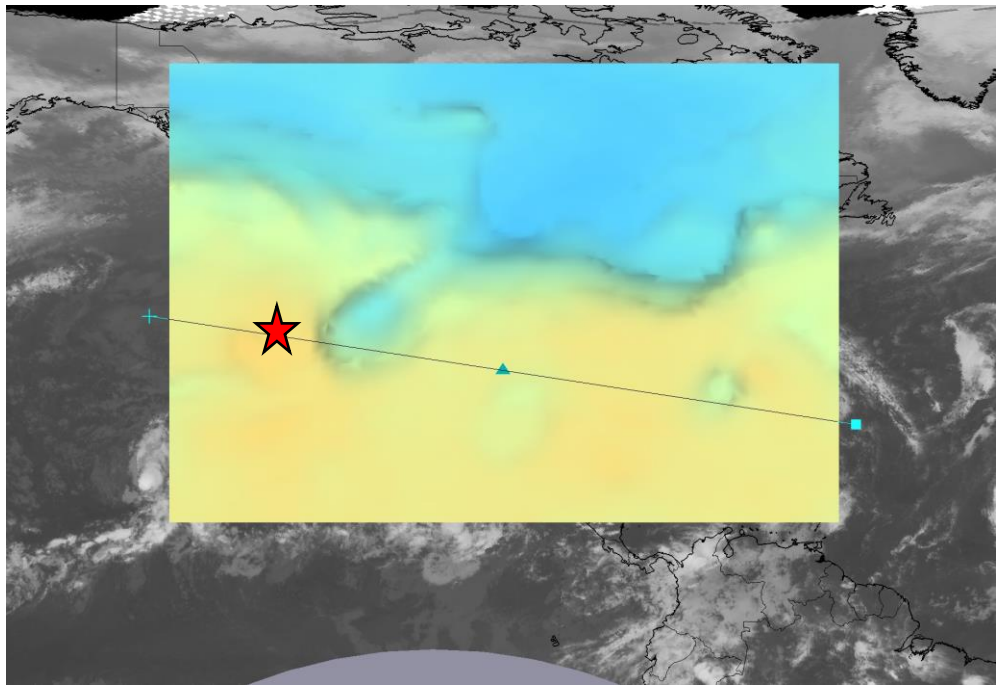
S

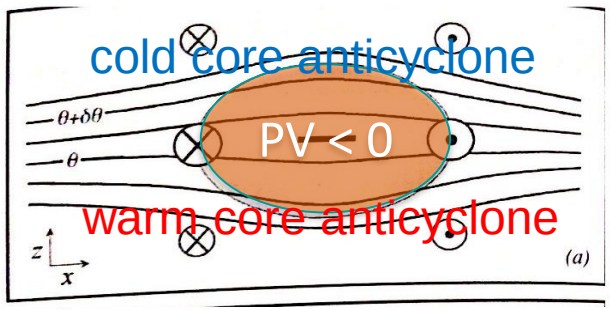
N

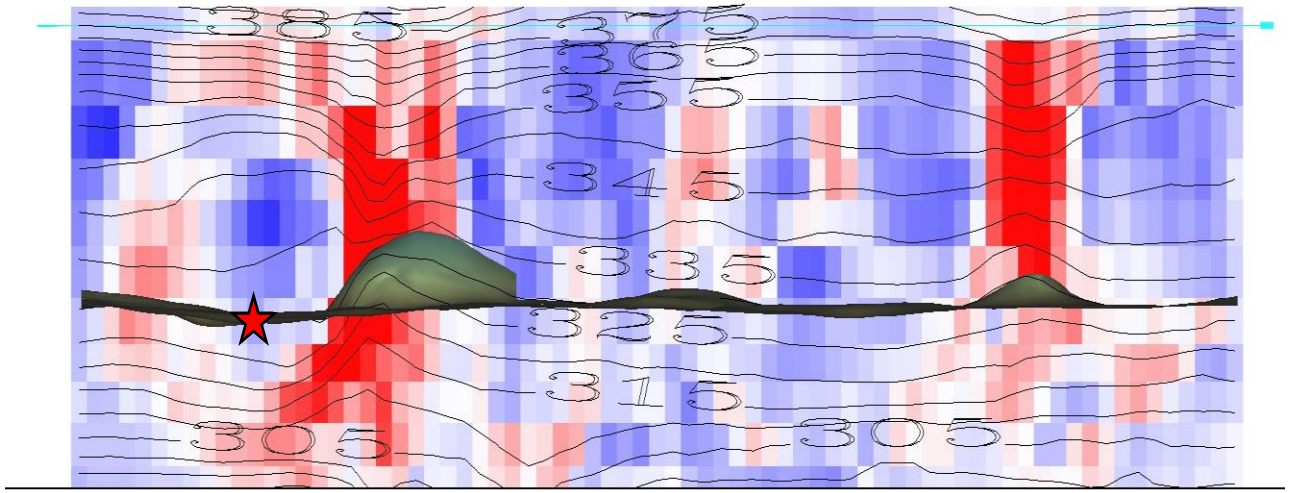
Top viewpoint



A depression in the 330K surface

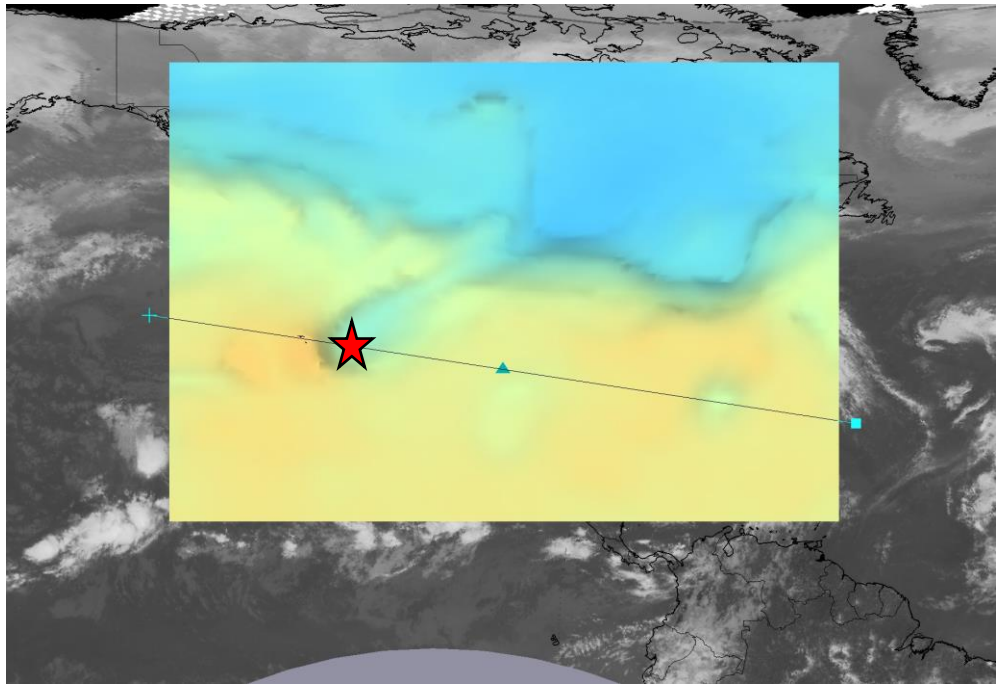


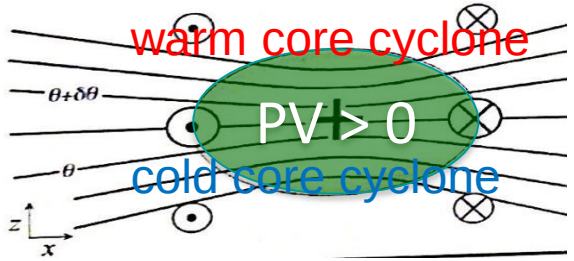


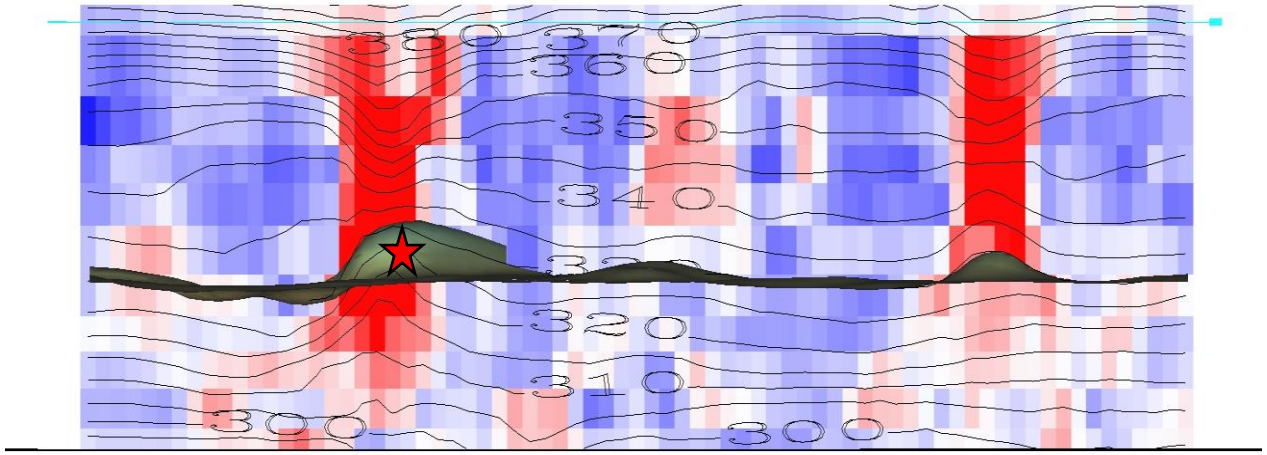


330K surface depression happens within the warm core anticyclone and cold core anticyclone.

A peak on the 330K isosurface







330K surface peak happens within the cold core cyclone and warm core cyclone.

Mean slope of the 360K isosurface

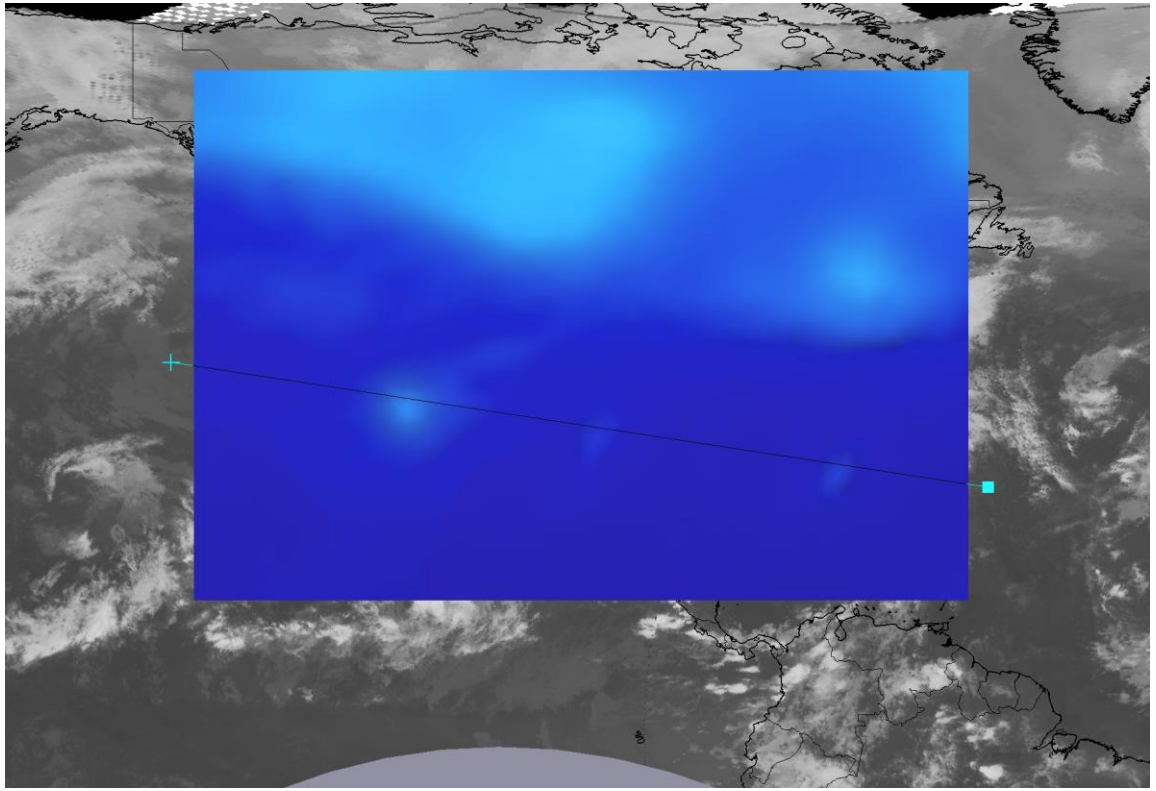
- South-North slope

East viewpoint

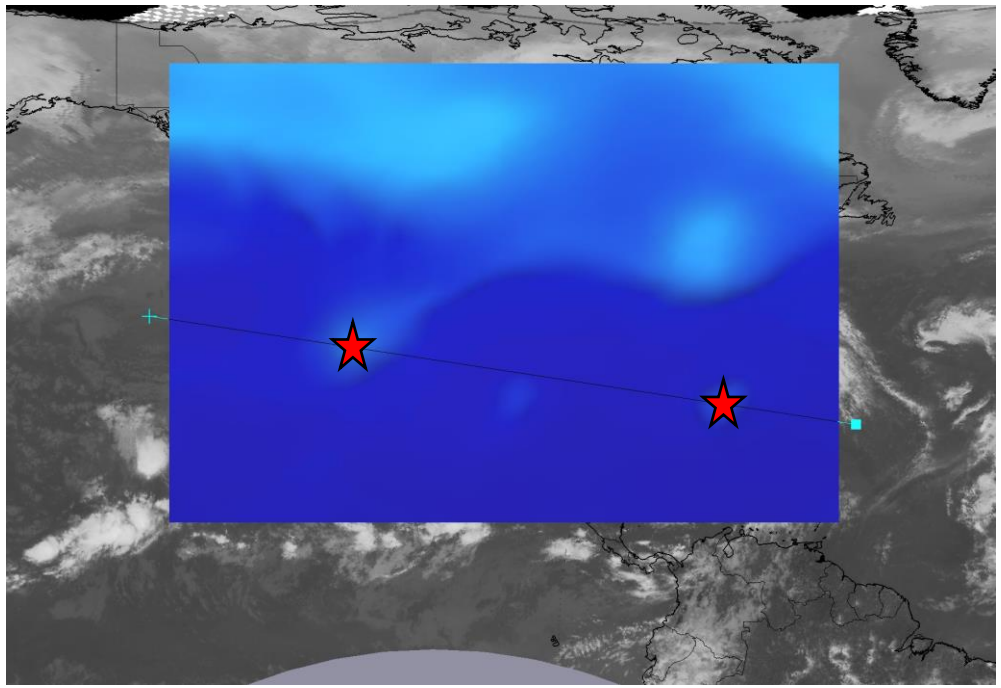
S

N

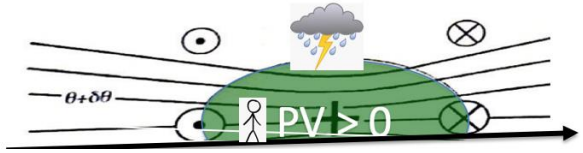
Top viewpoint

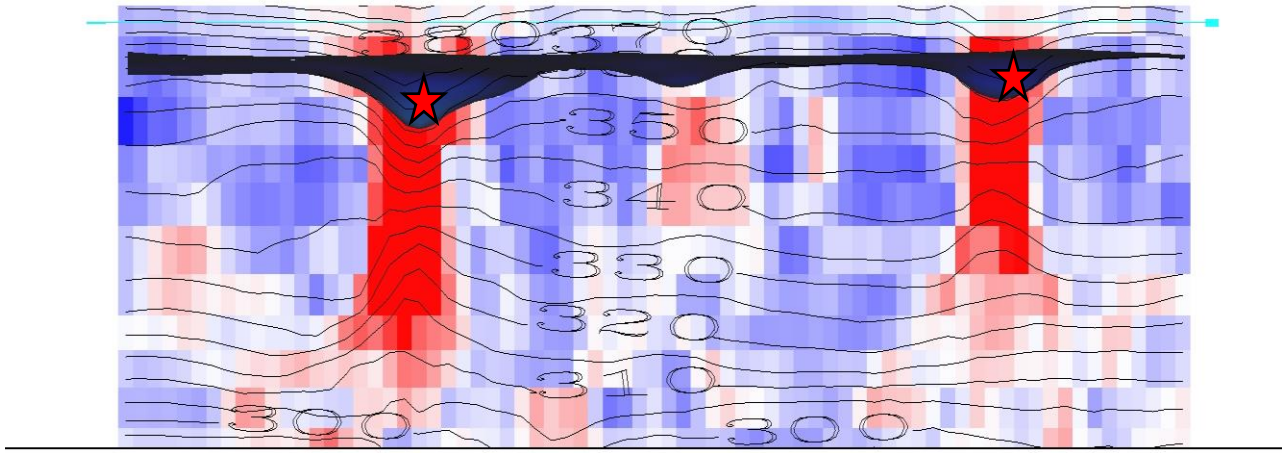


A depression in the 360K surface



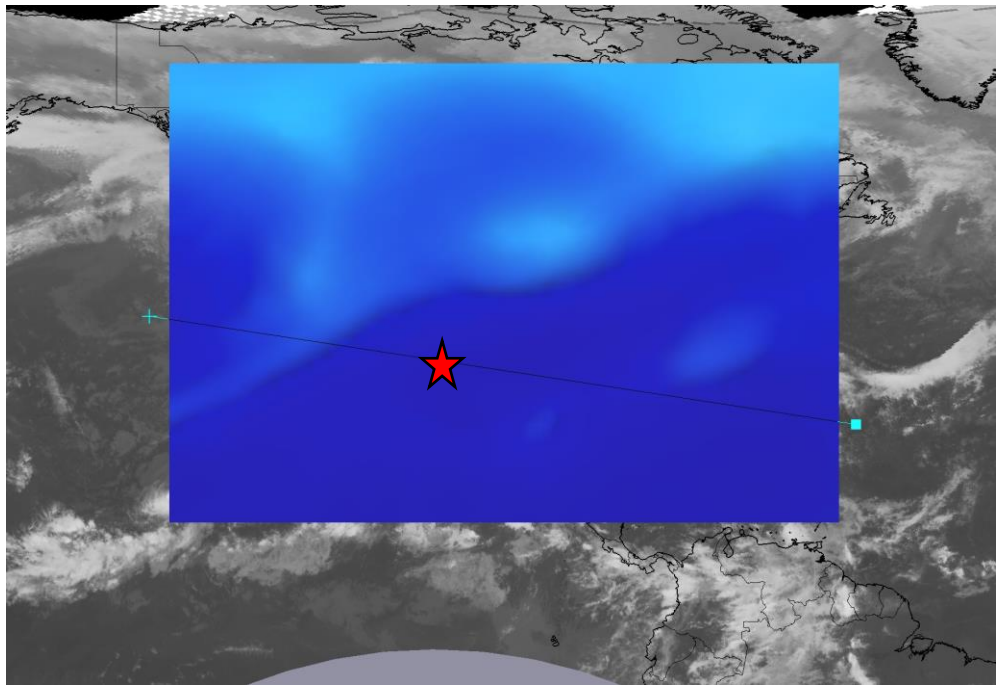
This is called a *warm core cyclone:*

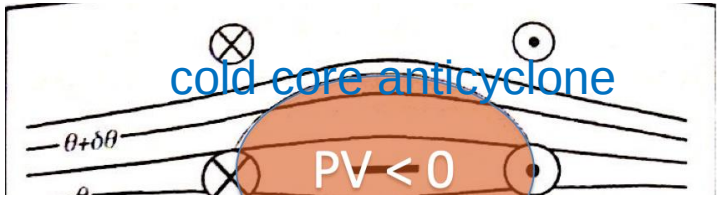


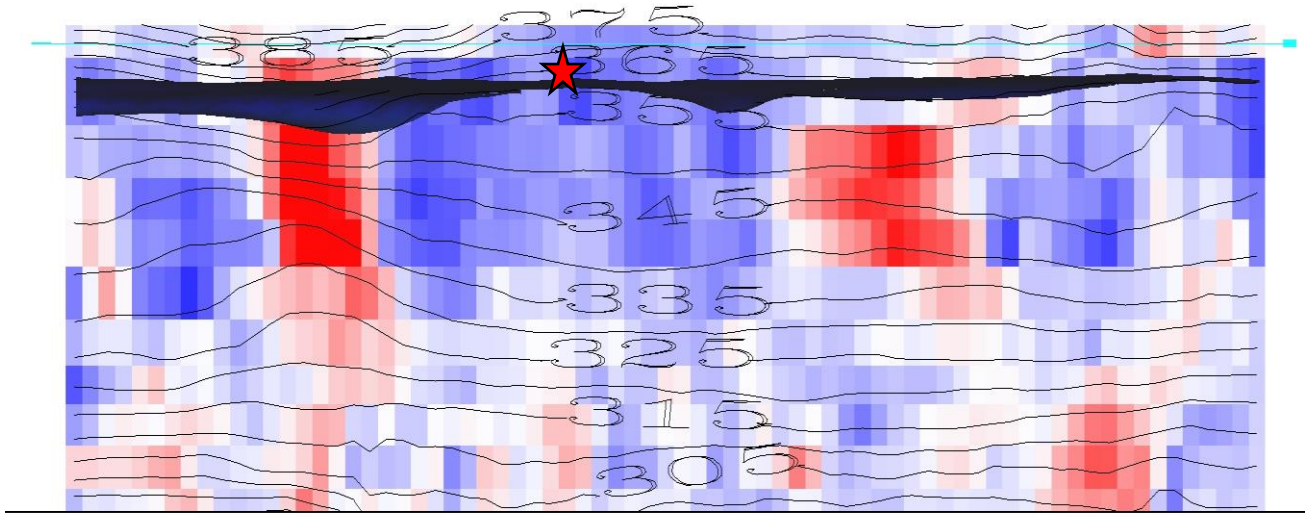


360K surface depression happens above the warm core cyclone.

A peak on the 360K isosurface







360K surface depression happens above the cold core anticyclone.

Use the Print facility of Powerpoint

- to put a PDF of this into your class Github repository
- so we can look them over in class